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A REVIEW ON CHEMISTRY, SYNTHESIS, NANO-FORMULATION, HOT COMPRESSED WATER EXTRACTION OF CURCUMIN AND EFFECT OF QUALITY OF WATER ON EXTRACTION PROCESS

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ABSTRACT

During ancient times, Curcuma longa, a perennial herb belonging to the turmeric family, was utilized in the culinary industry as a natural pigment. Decades of research have been devoted to determining the medicinal properties and function of curcumin in the prevention and treatment of cancer. This has led to the development of novel techniques for the extraction, purification, synthesis, and optimization of curcumin production and applications. The remarkable studies that investigated the extraction and purification of curcumin are available, but most of the techniques are still at the lab level. In this review, comprehensively, we have discussed the currently developed curcumin extraction, synthesis, nano-formulations, therapeutic uses and Hot Compressed Water Extraction technique.

KEYWORDS: Curcumin, synthesis, extraction, therapeutic use, Hot Compressed Water Extraction

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REVIEW ARTICLE

A REVIEW ON MICROSPHERES: TYPES, METHODS AND EVALUATION

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ABSTRACT

Controlled drug delivery system (CDDS) allows active pharmaceutical agent (API) to be released over extended periods of time, ranging from days to months, by using drug-encapsulating devices. Such systems have a number of merits over conventional drug delivery techniques, including the ability to customize drug release rates, safeguard delicate medications, and improve patient comfort and compliance. Microspheres are suitable carriers for numerous controlled delivery applications owing to CDDS's high bioavailability, prolonged drug release features, biocompatibility and ability to encapsulate a wide range of medicines. This review paper discusses fabrication techniques for microparticles, preparation and characterization processes used to prepare these microspheres, various types of microspheres such as on the basis of drug release pattern (matrix, coated, reservoir) and on the basis of drug delivery system (mucoadhesive, floating, bio-adhesive, radioactive, polymeric, and magnetic, etc.), and the key variables affecting drug release rates from encapsulated particles.

Keywords: Controlled drug delivery system, microsphere, mucoadhesive, floating, radioactive, magnetic

INTRODUCTION

One type of controlled drug delivery system (CDDS) is the microsphere. CDDS means that the drug is to be released for a prolonged time interval but frequent use of drug is required when the drug has a short half life. CDDS basically enhances the efficacy of drug, as it overcomes the process of basic conventional dosage forms[1]. They are free flowing powders mainly having protein structure and also contain various polymers[2]. Microspheres are eco-friendly as they are biodegradable. Microspheres can also be called as micro particles. They have a particle size not more than 200 µm. The main purpose is not to cause any inconvenience to the patient[3]. The medicaments are encapsulated, homogeneously dissolved or suspended into the polymer, and put into capsules. Microspheres have gained much attention because they release the medicament slowly to enhance the optimum activity for a definite period of time. It causes minimum toxicity as it is having minimum side effects. Microspheres have also been used in the research field and also used in pharmaceutical sciences. Microspheres have a specific drug delivery target system. Microsphere can also be used in the CDDS of vaccines, antibiotics, etc. The sustained version of the drug is released using the microspheres used for oral administration[4].

Need for CDDS

In the detailed study of dosage forms (conventional and controlled), the drug release mechanism for both the delivery systems is plotted in the form of graph drawn between drug concentration and time of administration of drug. The release profiles are shown in Fig. 1 and Fig. 2.

History of microspheres

As compared to the past decades, we have gained more knowledge about microspheres as compared to all other dosage forms. A lot of research has been performed on this. The first research was carried out by

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Experimental Study of Castor Oil from Plant Seed *Ricinus Communis*: Extraction and Chemical Modification

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KEYWORDS

Castor beans, Specific gravity, pH, Acid value, Viscosity, Saponification Value

ABSTRACT:

Background: In this research we have prepared sulphonated castor oil or Turkey red oil, by the continuous addition of concentrated sulphuric acid to castor oil with continuous stirring for 3 h at a temperature of 25-30 °C. Since this continuous reaction is stoichiometry, there is no formation of waste product, thus eliminating any consequences related pollution.

Objectives: This research paper is carried out by experimental study of castor oil, through extraction of oil from castor beans, characterization and chemical modification of extracted castor oil.

Methods: The n-hexane or petroleum ether was used as a solvent for the extraction process. After extraction the castor oil was purified through degumming, neutralization and bleaching process using adsorbent activated clay. The extracted oil was chemically modified to produce Turkey red oil with the help of sulphonation reaction.

Results: The physico-chemical analysis revealed that all the physico-chemical properties of the extracted oil such as pH, acid value, iodine value, saponification value and specific gravity, viscosity, have almost similar values. In case of sulphonated castor oil the parameters like specific gravity, pH, iodine value, and acid value shows slight increase with respect to the standard values as per Indian Pharmacopoeia (IP), whereas viscosity value has slight decrease. Remaining all parameters like reaction time, color of product and solubility were similar.

Conclusions: The synthesized sulphonated castor oil (Turkey red oil) could be valuable as additive in food industry (as excipient or additives), cosmetics (as a pigment remover), and in pharmaceutical industries as coating agent, polymer, antifungal agent, laxative, immunity booster, etc.

1. Introduction

Vegetable oils [1] play an important role in the production of the national economy because seed oils bring great benefits to human existence and reduce the burden on people's lives today. Castor seed oil belongs to the vegetable oil family [2]. Generally, vegetable oils or fats are common plant-derived lipid substances that are physically found to be in a liquid state at room temperature, whereas fats are in a solid state at room temperature [3]. Vegetable oils are composed of triglycerides that do not contain glycerin in their structure [4]. Many commodities from plant sources such as soybeans [5], rapeseed [6], palms [7], corn [8], jatropha [9], and castor seeds [2] have been considered petroleum candidates. Among these sources, castor oil is a potentially promising raw material as it is known

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Lantana camara L.: Exploring Its Ethnobotanical, Phytochemical, Pharmacological, and Toxicological Profiles

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Abstract

In the present era, researchers are focusing on medicinal plant research throughout the world as medicinal plants are an important and cheap source of drugs and have a long history. Most of the remedies in the traditional system were taken from plants due to lack of technology, and using plants as medicines were proven to be useful. Lantana camara L. (Verbenaceae) is an aromatic plant as well as a rich source of medicinal compounds. From decades the plant is used to treat many diseases i.e., malaria, fever, cold and cough etc. Several essential phytochemicals have been isolated from L.camara L., including triterpenoids, flavonoids, alkaloids, saponins, steroids, and tannins. Moreover, it is also known as an essential oil-producing plant, and the essential oil is available in the market known as Lantana oils. Thus due to the above mentioned economic as well as medicinal properties of L.camara L; there is a need of a comprehensive report on the ethnobotanical, phytochemical, pharmacological and toxicological aspects of L. camara L. This review will be useful for researchers working in the field of genomics, metabolomics and molecular studies of medicinal plants.

Keywords: Medicinal plant, pharmacological activity, Phytochemical, Lantana camara

1. Introduction

Linnaeus recognized the genus Lantana camara L., which belongs to the family of plants known as Verbenaceae, in the year 1753 as a plant that had medicinal, ornamental, and essential oil-producing properties. Six of its seven species have been discovered in the Americas, while the seventh has been discovered in Ethiopia [1]. Its origins can be traced back to South America, but it is now present in nearly fifty countries throughout the globe, with some of those countries even permitting its production [2]. The plant is commonly used as a decorative element in gardens and is also known as sagebrush and red sage [3]. At elevations of up to two thousand metres, L. camara can be found growing in regions that are classified as either tropical, subtropical, or temperate [4].

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(REVIEW ARTICLE)

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Role of *Cinnamomum verum* leaves in the management of Vascular dementia: A comprehensive overview

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Abstract

Spices are utilized for both culinary and medicinal purposes and have been for a very long time originating from Sri Lanka and southern India, *Cinnamomum verum* may also be found in other Asian, Caribbean, Australian, and African countries. The principal compounds contained are Cinnamaldehyde and Eugenol, both of which have unique medicinal qualities in the leaves of *Cinnamomum verum*. Cinnamonaldehyde (CA), a bioactive phytochemical offer therapeutic advantages against the beginning of cardiovascular illnesses. Eugenol is an organic compound found in the leaves of *Cinnamomum verum*. Eugenol has antihypercholesterolemic and antiatherogenic effects. Eugenol's smooth muscle relaxant effect is due to its inhibition of receptor-operated and voltage-sensitive channels. Endothelial cells create nitric oxide (NO), which relaxes blood vessels. Eugenol has substantial anti-inflammatory properties. The antipyretic activity of eugenol is well recognized, since it reduces fever by reducing prostaglandin and sodium archidonate synthesis. Eugenol's hydrophobic nature allows it to pass the blood-brain barrier and enter the brain. Eugenol protects neuronal cells against the oxidative and excitotoxic effects of N-methyl-D-aspartate (NDMA). Eugenol has neuroprotective properties in hippocampal tissues due to its capacity to reduce brain-derived neurotrophic factor (BDNF) and postpone amyloid β -peptide (A- β) induced cell death via abnormal Ca2+ blocking. Anti-hypertensive property of Eugenol is known as it has the ability to activate TRPV channels and to relax endothelium-depleted arteries. Eugenol, which is found in *Cinnamomum verum* leaves, has been shown to be beneficial in the control of hypertension and so may be beneficial in the management of vascular dementia.

Keywords: *Cinnamomum verum*; Cinnamon; Eugenol; Anti-hypertensive; Neuroprotective; Vascular dementia

1 Introduction

Spices are vital food components that play an important function in meal preparation. Around the world, over a hundred plant species are utilized as spices and condiments. They are fragrant, dried plant pieces derived from seeds, fruits, leaves, roots, and bark, among other things. Since ancient times, they have been used to add flavor to dishes and improve food quality [1]. A variety of spices also serve as great preservatives, extending the shelf life of food by delaying the rotting process [2]. Furthermore, spices, as a rich reservoir of physiologically active chemicals, have antioxidant, antibacterial, anti-inflammatory, anti-diabetic, and anticancer effects, among others [3].

Cinnamon is a spice derived from the inner bark of many plants of the genus *cinnamomum*. Cinnamon is known in German as ceylonzeimt/kaneel, in hindi as dal-chini, and in Italian as cannella [4]. Cinnamomum is one of the earliest spices known to have been used in cooking. Though several species in this genus are sold as cinnamon, the inner dried bark of *Cinnamomum verum* J. Presl (family lauraceae) has traditionally been regarded as the authentic cinnamon. Its medicinal and culinary benefits have been widely documented in ancient literature extending back 4000 years [4].

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A review : The Pharmacological activity for chemical constituents of "*NIGELLA SATIVA* "

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Abstract:

Nigella sativa, also known as Black Seed, is a plant with seeds that have been used as a spice for a long time. People also call it by various names like Kalonji, Black caraway, and Black cumin. Recently, there's been a growing interest in natural remedies, like Nigella sativa, because they have fewer side effects compared to pharmaceutical drugs.These seeds are packed with nutrients. The oil in the seeds is full of healthy fats, and the essential oil has antioxidants like thymoquinone and carvacrol. While it expands globally, its main growth regions are Eastern Europe, the Middle East, and Western Asia . It is grown commercially in several Indian states, including West Bengal, Punjab, Jharkhand, Himachal Pradesh, Bihar, and Assam. Also involved in small-scale farming are the states of Tamil Nadu, Rajasthan, Madhya Pradesh, and Uttar Pradesh They also contain proteins, alkaloids, and saponins, which are good for health.People use Nigella sativa and its components to improve health and treat various conditions like jaundice, fever, digestion problems, paralysis, piles, and skin diseases.This review focuses on how the chemicals in Nigella sativa work in the body to provide these health benefit.

Key words: Black cumin , Thymoquinone, Bioactive, Paralysis, Neutraceutical.

Introduction:

Black Seed (scientific name Nigella sativa) is derived from the Latin word "Niger" (black) (1). A popular spice is Nigella Sativa, according to its botanical name. It's also known by the names Black cumin, Black caraway, Black seed, Roman coriander, Kalonji, nutmeg bloom, and fennel flower (2). While it expands globally, its main growth regions are Eastern Europe, the Middle East, and Western Asia (3, 4).It is grown commercially in several Indian states, including West Bengal, Punjab, Jharkhand, Himachal Pradesh, Bihar, and Assam. Also involved in small-scale farming are the states of Tamil Nadu, Rajasthan, Madhya Pradesh, and Uttar Pradesh (3).Its seeds contain more than a hundred essential components, including fatty acids, volatile oils, proteins, carbohydrates, saponins, alkaloids, tannins, flavonoids, sterols, and trace minerals (5,6).There have been described activity related to hepatoprotection, renal protection, gastroprotection, analgesic, antibacterial, anti-inflammatory, spasmolytic, bronchodilator, antioxidant, antidiabetic, anticancer, and immunomodulator (7).The seeds of this plant are

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commonly called "black cumin" in English, "habbat us sauda" in the Middle East, and "Kalonji" in southern Asia (8).In traditional medicine, the seed of this plant was used to cure a wide range of conditions, including back pain, asthma, fever, bronchitis, cough, chest congestion, dizziness,Ji paralysis, chronic headache, inflammation, infertility, and various gastrointestinal disorders like dyspepsia, flatulence, diarrhea, and dysentery.(9).

Common names: Kalonji seeds are commonly known as black seed, black cumin, or nigella seeds,Fennel flower, Black caraway,Roman coriander (2,10)

Botanical Description (11-15)

Black cumin :The hardy annual plants known as black cumin grow to a height of 20 to 60 cm (8 to 24 inches). Leaves and roots Fine, finely divided leaves adorn the branched stems, and the plant boasts a well developed taproot.

Flowers: The flowers are pale blue or white, with five petals, many stamens, and five or six long fused carpels.

Seeds-The dark, triangular or pyramid shaped seeds are carried in a capsule Consisting of five or six segments, each

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A review: The pharmacological activities of Murraya koenigii Spreng.

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Abstract: Murya koenigii in English as Kariputta or kadiputta in Nepali as well as Hindi. The biological source of Murraya koenigii is Murraya koenigii spreng and it belonging family Rutaceae. It was found in Himalayas, Maharashtra, Tamilnadu, Andhra Pradesh, Assam, Andaman and Nicobar island. It is one of the main component of formulation in the traditional ayurvedic system of Medicine many centuries. It is used in the treatment of many disease including kidney stone, dysentery disorder, renal pain, stomach upset and morning sickness. Blood purifier. The leaves , roots and bark of this plant are rich in source of carbazole alkaloid. Different part of the plant are used in Leaves, Stem, roots, fruit and seeds that is used to provide the strengthening of immune system. There are various Pharmacological activities are. Anticancer,anti diabetic, antibacterial, antitumor, antihelmintic, antioxidant and hepato protective properties. The curry tree is having many disease protecting ingredients which can be used as natural source to make newer, alternative and innovative medicines. The leaves are used traditionally as a spice in curry and other eatables. Plant have been used in traditional medicine for several thousand years. Curry leaves used traditionally as blood purifier. febrifuge. World about 80% population relies upon herbal product because they have been considere as safe effective and economical. Medicinal plant are used in herbalism and thought to have some medicinal properties. They are easily available source for health care purpose in rural and tribal area. Ethnobotany is a distinct branch of natural science dealing with various aspect such as anthropology, archaeology, botany, economics and medicine religious, cultural and several other discipline.

Keywords.

Murraya koenigii, Anticancer, Antioxident, Antihelmintic, Hepatoprotective.

Introduction:

Murraya. Koenigii spreng belonging to family Rutaceae and it is usally known as M. koenigii is referred to as kariputta or kadiputta in Hindi and Nepali. Different parts of the plant are used like leaves, stem , root, fruit, and seeds that is used to provide strengthing immune system It was found in Himalayas, Maharashtra, Tamilnadu Andhra Pradesh , Chittagong, karnatka, Assam, Andaman and Nicobar island Different biological properties of M Koenigii possess Anti- Inflamatory, Antibacterial, Antidiabetic, Antioxident and anti- protozoal properties[Gunjan P. malode et.al. 2021]. Curry leaves contain many important ingredient like carbohydrates, protein, fiber, calcium, phosphorous, iron, magnesium, copper, mineral and vitamin like nicotinic acid, nutrients B, C, A, and E, Flavonoids, glycosides, plant sterols, and antioxidants. Murraya koenigii boiled with coconut oil to condensed to residue that are used as dominant hair tonic for retaning and maintaining of natural hair tone , hair stimulation and prevention of premature growing hair[DR Priyanka Gupta 2020]. The oil is applied externally for blisters, eruptions, and in the fragrance and soap industries Murraya koenigii is a semi-evergreen aromatic tree used for febrifuge, analgesic, and skin eruption purposes.It is a staple in Indian dishes and is well known for its subtle flavor and used confidently in daily cooking The british were India they called it curry leaf naming after the seasoned sauce it was added to Murraya koenigii possesses a lot of bioactive principles, which have made it a valuable medicinal plant, but scientists haven't given it much thought[Rajendran MP2014]. Murraya koenigii is proven as natural medicinal plant. The leaves of the plant have been used in Indian Cuisine and also used for centuries in the Ayurvedic system of medicine. The bark is helpful in treating snakebite[Kang w 2018]. The tropical subtropical region in the world have large distribution of M. Koenigii [Harish KH.2012].Murraya koenigii Leaves are slightly bitter in taste, pungent in smell, and weakly acidic Various part of M. Koenigii are used to treat diabetic, chronic, dysentery, fever and diarrhea[Amit Choudhary 2020].The leaves of M. Koenigii are used traditionally to treat toothache and teething issues in babies, skin irritation caused by scabies and remedy for stomachache and headache [*Couse Sci & Indus Res.* 1962;6:125–127].Leaves and roots of C. Indica treat various health issue, such as flu, cold, joint dislocation, bone fracture, headache, colic and rheumatism, C Indica fruit are widely used in Vietnam and south Indian cooking mainly due to their aroma[Himadri Shekar Dutta 2021].

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POTENTIAL USE OF TRIGONELLA FOENUMNGREAEUM L., CANNABIS SATIVA L. AND ALLIUM CEPA OIL IN ALOPECIA.

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Abstract

Hair is a crucial aspect of identity, contributing to self-worth and confidence. It is a modified epithelial structure formed through keratinization of germinative cells, growing as outgrowths of skin follicles. Factors like infections, autoimmune disorders, chemicals, medications, diabetes, trauma, poor circulation, diet, and malnutrition can lead to hair loss. Symptoms include breakage, gradual loss, especially at the crown. Fenugreek, rich in vitamins and nutrients, nourishes hair follicles and boosts blood flow to the scalp, aiding hair growth and reducing hormonal imbalance-induced hair loss. Hemp, with cannabinoids like CBD, stimulates hair follicle cells and enhances effects of treatments like finasteride. Onion oil, high in sulphur, strengthens hair and prevents loss by promoting collagen production. These herbs have beneficial chemical qualities for hair growth and scalp health maintenance when combined into an oil.

Keywords: Hair, Hair re-growth, Scalp, Hair fall, Oil, Fenugreek, Cannabis, Onion.

Introduction

Hair is the essential part of the human personality and a leading essential for self confidence and self-esteem. To guard against its loss has ever been an important aspect. Alopecia is common problem in youngsters specially these days [1]. Hair loss is a common and distressing disorder that involves genetic, dietary, medical, and environmental variables. Androgenic alopecia, or male-pattern baldness, is the most prevalent cause of hair loss in males, whereas medical diseases including hypothyroidism, oral contraceptives, and nutritional deficiencies cause hair loss in women [2, 3]. Humans are born with roughly 100,000 terminal hair follicles on the scalp, which are predisposed to generate long and thick hair [4]. Hair grows in a precise cycle with three unique and concurrent phases: anagen (3 to 5 years), catagen (2 to 3 weeks), and telogen (3 to 4 months), followed by shedding. During the telogen or resting phase, hair is liberated and lost, and the following cycle begins at any moment [4-7]. Ninety percent of the hair on a healthy scalp is growing, with less than 1% experiencing involution and the remainder resting (5% to 10%) [8]. It is considered typical to shed 100 hairs from the head per day. However, a greater rate of physiological loss is a serious worry across the world because, if it continues to be excessive, it may develop in male or female pattern alopecia, which causes

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(RESEARCH ARTICLE)

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Formulation and evaluation of antibacterial and antioxidant herbal cream of curry leaves and turmeric extract

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Abstract

Humanity relies on plants to meet its basic needs, such as food, clothing, and shelter. Both rural and urban civilizations benefit from wild plants for medicinal, craft, and beauty purposes. *Murraya kienigii Linn* (Rutaceae), also known as Meethi Neem or Curry Patta, is a fragrant, usually deciduous shrub or small tree that can grow to be 6 meters tall. It may be found all throughout India and reaches heights of up to 1500 meters. It is cultivated for its fragrant leaves. In traditional medicine, it is used as an antiemetic, antidiarrheal, dysentery, febrifuge, blood purifier, tonic, stomachic, and flavoring agent in curries and chutneys. The essential oil derived from the leaves contains alkaloids such as mahanine, koenidine, koenigine, koenine, girinimibine, girinimbiol, murrayamine, and several more.

Another plant Turmeric (*Curcuma longa L.*) belongs in the ginger family, which is native to Southwest India. Turmeric is a medicinal and fragrant plant that is recognized as one of nature's most valuable resources, with enormous export potential in medicine, personal care, culinary spices, and natural colours. An ethanolic extract of turmeric including curcumin, dimethoxy-curcumin, and bisdemethoxycurcumin has been shown to reduce blood glucose levels in mice and prevent blood glucose from rising. Reduces proteinuria and haematuria when taken orally in people with refractory lupus nephritis. Curcuminoid is the most abundant component in turmeric, along with many other phenolic compounds and mono-, sesqui-terpenes.

Soxhlet extraction combines both percolation and maceration techniques. The extraction is carried out using a particular device known as the Soxhlet apparatus, which was created by Franz von Soxhlet in 1879. It was one of the most popular extraction methods, and it is still commonly used today. The apparatus comprises of an extraction chamber linked to a vapor duct and a siphon tube that continues down to the joint, where a circular bottom shell may be attached. A thimble of filter paper or a cotton plug is put in the extraction chamber to prevent the siphon tube from being blocked when powdered medication material is introduced. In this extraction we will use the Soxhlet extraction method to extract the phytoconstituents of the respective plants.

Keywords: *Murraya Koenigii*; *Curcuma longa L.*; Anti- bacterial; Anti-oxidant; Herbal cream.

1. Introduction

1.1. Curry Leaves (*Murraya Koenigii*)

Humanity uses plants in a variety of ways to satisfy its fundamental requirements, including food, clothing, and shelter. Wild plants provide medicines, crafts, and cosmetics to both rural and urban cultures. Wild plants provide revenue and job opportunities in rural regions [1]. Herbal items include spices, herbal teas, functional food components, medical raw

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AMELIORATIVE POTENTIAL OF METHANOLIC TWIGS AND LEAVES EXTRACT OF *NYCTANTHES ARBOR-TRISTIS* ON DIABETES INDUCED NEUROPATHIC PAIN IN ALBINO WISTAR RATS

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ABSTRACT

Background: *Nyctanthes arbor-tristis* is a small ornamental tree renowned for its anti-diabetic activity. Being a rich source of all useful phytoconstituents, traditionally, it's also used in treating many other diseases. However, its role in curing diabetic neuropathy is still not clear. The main objective of this study is to investigate the potential effect of *Nyctanthes arbor-tristis* against streptozotocin (STZ)-induced diabetic neuropathy in rat.

Method: The study was planned with 36 animals and 6 animals in each group. Group 1 (Control group), Group 2 (Diabetic Control), Group 3 (Active Control), Group 4(Test Group-1), Group 5(Test Group-2) & Group-6 (Test Group-3). STZ (50mg/kg) was given intraperitoneally to induce diabetes in Albino wistar rats. After 21 days animals' were assessed for diabetic neuropathy. Rats with diabetic neuropathy were treated for 3 weeks with methanolic extract of *Nyctanthes arbor-tristis* leaves & twigs (100,200,400mg/kg p.o.).,Glibenclamide (10mg/kg p.o.) and amitryptiline (10mg/kg i.p) were used as standard drug. Treatment outcomes were based on metabolic, physiological & biochemical changes.

Result: Treatment with methanolic extract of *Nyctanthes arbor-tristis* significantly decreases blood sugar levels and neuropathic pain as compared to the disease control

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Nanosuspension as a Promising Drug Delivery Approach for the Antidiabetic Drug: An Inclusive Review on Technology and Future Aspects

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Abstract. Nanosuspension is a part of nanotechnology which is a submicron colloidal dispersion of pharmaceutically active ingredients in a liquid phase having a size range below 1 um, and which is stabilized by surfactants and polymers. Most of the newly developed drugs are water-insoluble, show poor bioavailability. Glimepiride is an anti-diabetic drug that belongs to the sulfonylurea class, which is used to treat type II diabetes mellitus. Glimepiride increases insulin secretion by acting on the β-cells of the pancreas. Glimepiride binds to sulphonylurea receptors which are present on β-cell on the plasma membrane, which close the ATP-sensitive potassium channel leading to depolarization of the cell membrane. So there is the opening of voltage-gated calcium channel due to which there is an influx of calcium ions causes the secretion of the preformed insulin molecule. It is categorized under biopharmaceutical classification system class II drug, having poor solubility and high permeability. In this review, different methods were studied to formulate the nanosuspension of glimepiride to increase the solubility of glimepiride.

Keywords-Glimepiride, Nanosuspension, Anti-Diabetic, Solubility, Polymers, Drug Deliver

INTRODUCTION

Diabetes mellitus (DM) is a chronic, life-long endocrine, and metabolic disorder that occurs due to a defect in insulin secretion and insulin action. Insulin is the hormone that is produced by a specialized cell called β-cells present on the organ pancreas. Normally our body breakdown the carbohydrates and sugars which convert into glucose molecule and act as fuel for our body, but for utilization of glucose, hormones insulin is required. The deficiency of insulin leads to an increase in the blood glucose level in a body along with disturbances in the metabolism of carbohydrates, fats, and proteins. If diabetes is uncontrolled then it leads to severe diabetic complications like retinopathy, neuropathy, and various cardiovascular complications.

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Critical review of current animal models of nephrotoxicity

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Abstract

Nephrotoxicity occurs when the renal blood is exposed to a nephrotoxic drug or toxin that causes damage to the kidneys. This may lead to acute kidney failure. In this condition the kidney function deteriorates and may lead to chronic kidney failure. If unchecked, the kidney failure may lead to the death. When kidney damage occurs, the kidney fails to remove excess urine and waste leading to retention of nitrogenous waste products of metabolism in the blood. The biochemical parameters commonly used to evaluate kidney function are serum urea, creatinine, uric acid, potassium, sodium and chloride. The animal models play a very important role for understanding the mechanism of nephrotoxicity and development of effective therapy for its optimal management. Since there are many pathways for induction of renal failure, therefore, a large number of animal models have been developed to produce the clinical conditions of renal failure. The present review will help to find an appropriate model to evaluate the new drug or molecule that can protect from nephrotoxicity.

Keywords: Animal, Model, Nephrotoxicity

Introduction

Nephrotoxicity can be defined as a renal disease or dysfunction produced by medication of drugs and other environmental factors and it is directly related to the (ARF) Acute renal failure (Lakshmi and Kiran, 2012) and (AKI) Acute renal injury is a reversible loss of function of renal cells in kidney that result in rapid fall in glomerular filtration rate (GFR) as well as retention of minerals and water (C. Late, 1996).

It has been found that drugs are responsible for 20% of all cases for (ARF) acute renal failure. Drug like antibiotics, anticancer, anti-inflammatory, NSAIDS, aminoglycoside exhibit and adverse effect on renal function and couse lose of immune system responses in the body. So in recent time, interest in drug-induced nephrotoxicity has been increased with increasing number of drugs to affect the renal cells (Ganguli and Prakash, 2003; Ogunnowo, 2015).

Most of the drugs are found to be harmful nephrons produce one or more pathogenic mechanism in the kidney. Pathological conditions include: hemodynamic, changes tubular cells toxicity, nephritis syndrome, urinary tract infection, chronic intestinal nephritis, and (Singh et al., 2014).

The present comprehensively required the methodology information regarding various animal models of nephrotoxicity.

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SHORT COMMUNICATION

Phytochemical and Therapeutic Potential of Herbal Cognitive Enhancer

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Abstract

Memory is the most significant factor in distinguishing one person from another, as it is necessary to recognise one's own self. The brain can encode, store, and retrieve information using three different types of memory. Individuals who lack these basic forms of memory are unable to create personal relationships, acquire new knowledge, and perform basic everyday duties. Memory refers to a person's ability to encode, store, retain, and recall knowledge and past events in his or her brain. Memory gives a person the ability to learn from and adapt to previous experiences, as well as the ability to recall previously taught facts, skills, and habits. Today, poor memory, weak recall, and low retention are all typical issues. Memory deteriorates primarily because of stress and exhaustion. Memory loss, often known as age-related memory impairment, is frequent in those over the age of 40. This could be linked to the loss of hormones and proteins (growth factors) that repair brain cells as people get older. Herbs were employed to improve memory power in India throughout ancient times. Indian and Chinese cultures developed many traditional medicines from herbs to treat diminishing cognition, reverse memory loss, and improve learning power. Nootropic herbs are known for their brain-acting herbs and smart medications, which are derived from their isolated ingredients and aid to improve blood circulation in the brain. The focus of this review is on natural agents and herbs that work as memory enhancers. By using one of the herbs at a time, one can improve his or her memory.

Keywords: Acetylcholine, Alzheimer's Disease, Herbs, Memory, Nootropics

1. Introduction

Memory is a typical learning ability that indicates long-term changes in the nervous system caused by short encounters. Short-term memory and long-term memory are the two types of memory. There are a variety of drugs available in the market for maintaining memory or enhancing memory but some of them have huge side effects also especially in the case of synthetic drugs[1]. *Bacopa monniera*, also called *Bacopa monnieri*, *Herpestis monniera*, and *Brahmi*, has been used in Ayurvedic medicine for millennia[2] in the case of study about memory the brain is the most important, the forebrain, midbrain, and hindbrain are the three fundamental sections of the human brain. It includes the hypothalamus, thalamus, cerebellum, cerebral cortex, hippocampus, midbrain, and several other glands, with the Hippocampus being important for memory. Memory is a very significant aspect for recalling situations, information, and experiences, but because of certain conditions like stress, negative emotions cause various illnesses such as amnesia, memory loss, high blood pressure, anxiety, and several serious life treatments in that individuals can record events, information, and stimuli over a time. Thus, over recent decades, herbs and natural cures are very useful in the promotion of intelligence such as *Medhya* herbs related

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REVIEW ON DIABETIC FOOT ULCERS ITS PATHOGENESIS, EPIDEMIOLOGY AND EMERGING TREATMENTS

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Abstract

Diabetic foot complications aren't exactly a hot topic. Diabetic nephropathy, heart attack and stroke aren't as common as diabetic foot complications although they are still the most common complications of diabetes. As a result of diabetic foot infections and lesions, the majority of diabetics are hospitalised and require long-term hospitalizations. In the case of diabetic foot ulcers (DFUs), which can lead to amputations of the limb, as well as significant social, psychological, and economic effects. A DFU can develop in up to 25% of diabetic people throughout the course of their lives, and more than half of those patients become infected. As a result, in order to avoid undesirable results, infection and ulcer recovery must be carefully managed. Doctors and patients alike should be aware of the latest developments in DFU treatment. An overview of the current assessment and treatment options for DFUs is provided here in order to assist clinicians in making educated decisions, including molecular and regenerative medicine; energy-based antimicrobial therapies; plant extracts; antimicrobial peptides; growth factors; devices; and nanomedicine.

Keywords: *Diabetic foot ulcers, Antimicrobial activity, Neuropathy, Therapeutic treatment*

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Review Article

An Update on Biodegradable Microspheres Loaded with Naltrexone

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ABSTRACT

The use of biodegradable polymers for microencapsulation of naltrexone using techniques like solvent evaporation is the need of the hour. The naltrexone microspheres for the preparation of matrix devices will help to understand the microencapsulation. Nowadays, the emphasis is being laid on the development of controlled release dosage forms. Interest in this technology has been increasing steadily over the past few years. Although the oral administration of drugs is a widely accepted route of drug delivery, the bioavailability of drugs often varies as a result of gastrointestinal absorption, biodegradation by the first-pass effect. There are many ways of achieving long-term drug delivery of parental origin; biodegradable microspheres are one of the better means of controlling the release of the drug over a long time. Likewise, emulsions, stability on a long-term basis, and in suspensions, rheological changes during filling, injecting, and storage possess a limiting factor. The extent of release rate in these systems cannot be tailor-made to the needs of the patient. Injectables formulations based on biodegradable microspheres can overcome these problems and can control the release of the drug over a predetermined period. In the order of days to weeks and even to the months. The effect of different process parameters, such as drug/polymer ratio and stirring rate during the preparation of microspheres, on the morphology, size distribution, and in vitro drug release of microspheres. The review mainly covers various molecules encapsulated in biodegradable microspheres for parenteral delivery.

Keywords: Biodegradable Microspheres, Naltrexone, polymers.

1. INTRODUCTION

Microspheres are characteristically free-flowing powders consisting of proteins or synthetic polymers, which are biodegradable and ideally having a particle size less than 200 µm [1] and which can be injected by 18 or 20 number needle [2]. The drug absorption and side effects due to irritating drugs against the gastrointestinal mucosa are improved because the biodegradable microsphere is made up

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Review Article

Antidiabetic Activity of Chemically Synthetic Compound on Alloxan Induced Diabetes in Mice

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ABSTRACT

Alloxan a nitrosourea derivative is one of the most universally accepted diabetogenic agents. The selective β-cell toxicity of alloxan depends on the degree of DNA alkylation and subsequent activation of poly ADP ribose synthetase in the base excision repair pathway, this stimulated activation of poly ADP ribose synthetase triggers exhaustion of NAD+ in the pancreatic islets that will lead to β-cell death through necrosis. In the present study, the objective was to study the evaluation of the antidiabetic activity of the chemically synthetic compound on alloxan-induced diabetes in mice. Chemically synthetic compounds were given to the mice after the administration of alloxan and glucose levels were estimated using a semi-auto analyzer at a range of 505/670nm. The hyperglycaemic levels due to alloxan administration lead to the development of diabetes. Treatment with chemically synthetic compounds significantly lowers the elevated glucose levels in alloxan-induced diabetic mice. Hence compound number 1321,05152,0717 has potential antidiabetic activity. To explore further exhaustive study is required for the mechanism behind the anti-diabetic activity of their chemical compounds.

Keywords: Alloxan, diabetogenic agent, antidiabetic activity, hyperglycaemic levels.

1. INTRODUCTION

Diabetes mellitus (DM), commonly referred to as **diabetes**, is a group of metabolic diseases in which there are high blood sugar levels over a prolonged period. Symptoms of high blood sugar include frequent urination, increased thirst, and increased hunger. If left untreated, diabetes can cause many complications. Acute complications include diabetic ketoacidosis and nonketotic hyperosmolar coma. Serious long-term complications include cardiovascular disease,

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MARKETING REGULATION OF DRUGS IN INDIA-REVIEW

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ABSTRACT

The pharmaceutical industry is one of the most regulated industries; no drug would be marketed without the teams of medical researchers and other specialists who worked to make sure it receives regulatory authority's approval. A regulatory authority is an agency of the government that is responsible for protecting public health in safety aspects. A Approval of the drug product for import, manufacturing and marketing in India, its demonstration for safety and efficacy in humans is essential. The Rules 122A, 122B and 122D, 122 DA, 122DAA, 122E and Appendix I, IA and VI of Schedule Y of the Drugs & Cosmetics Act, 1945, describes the information/data required for approval of clinical trial and/or to import, manufacture, or market any new drug in the country. Marketing of drug products is major concern issue now days. So every country has its own guidelines and own regulatory bodies for any drug approval and for marketing of the drug products. India is emerging as an important player in pharmaceutical field, but to maintain this growth and to emerge as a key player on the global market, a strong and supportive regulatory framework is essential or the advantage gained so far would be lost

INTRODUCTION

The current global economic climate is placing tremendous pressure on pharmaceutical companies to maximize the value of their assets. Sponsors with novel therapies seek to speed up time-to-market and introduce their products in multiple countries as quickly as possible. Companies with established products want to increase sales by expanding into additional markets to offset impending patent expirations. Confronted with these marketplace challenges, no pharmaceutical company can afford first-round submission failures or other regulatory delays that prevent its products from reaching their targeted markets in a timely fashion.

A proactive, regulatory filing strategy helps any pharmaceutical company large or small gets the most from its product portfolio by accelerating global product introductions while avoiding regulatory pitfalls. By understanding the differences in regulatory processes for countries around the world, and taking advantage of the Common Technical Document defined by the International Conference on Harmonization, pharmaceutical companies can significantly improve the speed and efficiency of preparing regulatory submissions while reducing the risk of costly delays.

Drug Regulatory Affairs:

Regulatory Affairs in a Pharmaceutical industry, is a profession which acts as the interface between the pharmaceutical industry and Drug Regulatory authorities across the world.It is mainly involved in the registration of the drug products in respective countries prior to their marketing.

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Research Article

METHOD DEVELOPMENT AND VALIDATION FOR THE SIMULTANEOUS ESTIMATION OF IN AMBROXOL AND LEVOCETIRIZINE BULK AND PHARMACEUTICAL DOSAGE FORM BY USING RP-HPLC METHOD

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ABSTRACT

A simple, accurate, economical and reproducible reverse phase high performance liquid chromatographic (RP-HPLC) method was developed and validated for the determination of Ambroxol and Levocetirizine in bulk and pharmaceutical formulations. The separation was achieved on a phenomenex C18 column (150 × 4.6 mm i.d, particle size of 5µ) using a mixture of 0.01M Potassium dihydrogen orthophosphate (pH 5.0 ± 0.05) & Acetonitrile (60:40 v/v) as mobile phase in an isocratic elution mode, at a flow rate of 1 ml/min. The detection was monitored at 230 nm. The retention time of was found to be around 3.60min (Levocetirizine) 4.68min (Ambroxol) respectively. Excellent linearity range was found between12-120 µg/ml for Ambroxol and 1-10µg/ml for Levocetirizine, n. The method was validated with respect to linearity, robustness, precision and accuracy and was successfully applied for the simultaneous determination of Ambroxol and Levocetirizine from the combined dosage formulation.

1. INTRODUCTION

Amroxol (AMB) is chemically Trans-4-(2-Amino-3,5- dibromobenzylamino)- cyclo hexan-1-ol AMB is Mucolytic ,respiratory agent and used in the treatment of the upper respiratory tract diseases. With its mucolytic activity, AMB facilitates the breakdown of acid muco polysaccharide fibres in the mucous thus making it thinner and less viscous for expectoration. As well it stimulates the production of pulmonary surfactant, a substance fiund to play a major role in the lung defense mechanism and thereby further protect it against inflammation and infection. Levocetirizine(LCTZ) is chemically (2-(4-[(R)-(4-chlorophenyl) (phenyl)methyl]- piperazin-1-yl) ethoxy)acetic acid.Levocetirizine is a third generation non-sedative antihistamine developed from the second generation antihistamine cetirizine. It is the R-enantiomer of the cetirizine which functions to block histamine receptors. More specifically, LCTZ does not prevent the actual release of histamine from mast cells but prevents its binding to its receptors. This in turn prevents the release of other allergy chemicals and increases the blood supply to the area providing relief from the symptoms of hay fever. Literature survey revealed that AMB and LCTZ has been estimated individually or in combination using UV, HPLC and HPTLC. The present work describes the development of a simple, precise, accurate and reproducible spectrophotometric method for the simultaneous estimation of AMB and LCTZ in Pharmaceutical dosage form[1-14].

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METHOD DEVELOPMENT AND VALIDATION FOR THE SIMULTANEOUS ESTIMATION OF IN ATORVASTATIN AND FENOFIBRATE BULK AND PHARMACEUTICAL DOSAGE FORM BY USING RP-HPLC METHOD

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ABSTRACT

A simple, accurate, economical and reproducible reverse phase high performance liquid chromatographic (RP-HPLC) method was developed and validated for the determination of Atorvastatin and Fenofibrate in bulk and pharmaceutical formulations. The separation was achieved on a Thermo Scientific BDS C18 column (250 × 4.6 mm i.d 5m) using a mixture of 25mMSodium acetate (pH adjusted to 5.0 With 1.0 M Glacial acetic acid): Acetonitraile (10::90 % v/v)as mobile phase in an isocratic elution mode, at a flow rate of 1 ml/min. The detection was monitored at 254 nm. The retention time of Atorvastatin and Fenofibrate was found to be around 2.672±0.05 min (Atorvastatin) 4.971±0.07 min (Fenofibrate) respectively. Excellent linearity range was found between 1-5 µg/ml for Atorvastatin and 1-5 µg/ml for Fenofibrate. The method was validated with respect to linearity, robustness, precision and accuracy and was successfully applied for the simultaneous determination of Atorvastatin and Fenofibrate from the combined dosage formulation.

1. INTRODUCTION

Atorvastatin (ATOR) is chemically7[2(4fluorophenyl)3phenyl4(phenylcarbamoyl)-5-(propan-2-yl)-1H-pyrrol-1-yl]-3,5-dihydroxyheptanoate. Atorvastatin is a HMG-COA reductase inhibiter actas anti- hyper lipidemic drug clinically effective drug in the treatment of Hyper cholestrimia . It issoluble in methanol, ethanol, and acetonitrile. Practically insoluble in water. Fenofibrate (FENO),propan2-yl2-{4-[(4-chlorophennyl)carbonyl] phenoxy}-2methyl ropionate is a widely used asAnti-cholesrtimic agent as ppar receptor inhibiter. Atorvastatin and Fenofibrate is available incombined dosage forms as film coated tablets (LIPIKIND). Each tablet contains 10mg of Atorvastatin and 160 mg of Fenofibrate. It is used for the treatment of Hyper Cholestrimia.

For this combination derivative spectroscopic methods and reverse phase liquid chromatographic methods are reported. However, there is no work reported on combination of these drugs by standard addition simultaneous equation method. Hence fast, simple, and accurate and validated spectrophotometric method was developed by standard addition of both drugs by applying simultaneous equation method, the developed method was simple, accurate, precise, specific, sensitive and reproducible which can be efficiently and easily applied to pharmaceutical dosage forms.

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Research Article

FORMULATION AND EVALUATION OF MIRTAZAPINE ORAL THIN FILM

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ABSTRACT

The aim of this present investigation was to develop a rapid dissolving oral polymeric film, using the solvent casting method, having good mechanical properties, instant disintegration and dissolution, an acceptable taste in the oral cavity. Mirtazapine is a tetracyclic antidepressant drug mainly in patients affected by depression The present investigation was undertaken with the objective of formulating of the Mirtazapine rapid dissolving oral thin films allowing fast reproducible drug dissolution in oral cavity thus bypassing first pass metabolism, to enhance the convenience and compliance by the elderly and pediatric patients .Nine formulation of films with drug were prepared using both natural and synthetic polymers like HPMC E6 and Sodium Alginate. Propylene glycol was used as plasticizers. Citric acid was used as a saliva stimulating agent. Synthetic Aspertame was used as sweetening agent. The resultant films were evaluated for weight variation, assay, content uniformity, folding endurance, thickness, tensile strength, percent elongation, surface pH, *in vitro* disintegration and *in vitro* dissolution. The F4 formulation showing the best results. the disintegration time is only 3.5 second. and was releasing upto 100.8% of drug within 20 minutes.

Keywords: Mirtazapine . solvent casting method. Oral thin film and HPMC E6.

INTRODUCTION

More recently, fast-dissolving films are gaining interest as an alternative to fast-dissolving tablets to definitely eliminate patients' fear of chocking and overcome patent impediments. Fast-dissolving films are generally constituted of plasticized hydrocolloids or blends made of thereof that can be laminated by solvent casting or hot-melt extrusion

The oral route is one of the most preferred routes of drug administration as it is more convenient, cost effective, and ease of administration lead to high level of patient compliance. The oral route is problematic because of the swallowing difficulty for pediatric and geriatric patients who have fear of choking. Patient convenience and compliance oriented research has resulted in bringing out safer and newer drug delivery systems. Recently, fast dissolving drug delivery systems have started gaining popularity and acceptance as one such example with increased consumer choice, for the reason of rapid disintegration or dissolution, self-administration even without water or chewing.

Mirtazapine is a tetracyclic antidepressant used mainly in patients affected by depression[1,2]. The novel antidepressant mirtazapine has a dual mode of action. It is a noradrenergic and specific serotonergic antidepressant (NaSSA) that acts by antagonizing the adrenergic alpha2-autoreceptors and alpha2-heteroreceptors as well as by blocking 5-HT2 and 5-HT3 receptors[3,4]. It enhances, therefore, the release of nor epinephrine and 5-HT1A-mediated serotonergic transmission. Increased activation of the central 5-HT_{1A} receptor is thought to be a major mediator of efficacy of Mirtazapine .This dual mode of action may conceivably be responsible for mirtazapine's

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Review Article

Recent Advances in Particle Characterization and its Application in Pharmaceutical Industry

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ABSTRACT

Particle size characterization is a area of analytical chemistry which is required in a great number of industries where the product's end-use is affected by particle size distribution. The Particles can be in the form of solids, liquids, or gases or an aggregation of molecules as in the case of micelles. Particularly In some instances, especially in the area of pharmaceuticals finished forms, analyses are done to ensure the absence of particulate matter in the product. Particle size characterization helps in monitoring the environment accurately for particulate matter as well as particle size distributions, concentrations for full assessment of health hazard substances. The growing interest in particle size characterization and analysis, especially among analytical chemistry researchers, the subject is mainly emphasized on the application. The number of techniques available for particle size analysis is confounding. More than 250 methods have been reported by the analytical researchers for understanding and assessing the particle size.. Because of the broad scope of this area in terms of techniques and analytical approaches, products, and size ranges major technique areas have been discussed. which have received the most attention in recent years: radiation scattering and chromatographic techniques. The new and growing areas are rapidly becoming techniques of choice especially for the rapid analysis of submicrometer particles.

Keywords: Particle Size Characteristics, Analytical Technique, Size, Chromatographic techniques

1. INTRODUCTION

Particle size characterization techniques currently in use within pharmaceutical industry and academia. It assumes no prior knowledge of particle characterization theory or instrumentation and should be ideal for those new to particle

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